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Wu

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(54) **NETWORK DATA TRANSMISSION CABLE CONNECTOR**

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(22) Filed: **May 23, 2001**

(51) **Int. Cl.**[7] **H01R 13/648**; H01R 11/20; H01R 4/24; H01R 4/26

(52) **U.S. Cl.** **439/608**; 439/418; 439/944

(58) **Field of Search** 439/607, 608, 439/418, 676, 344, 944; 179/27

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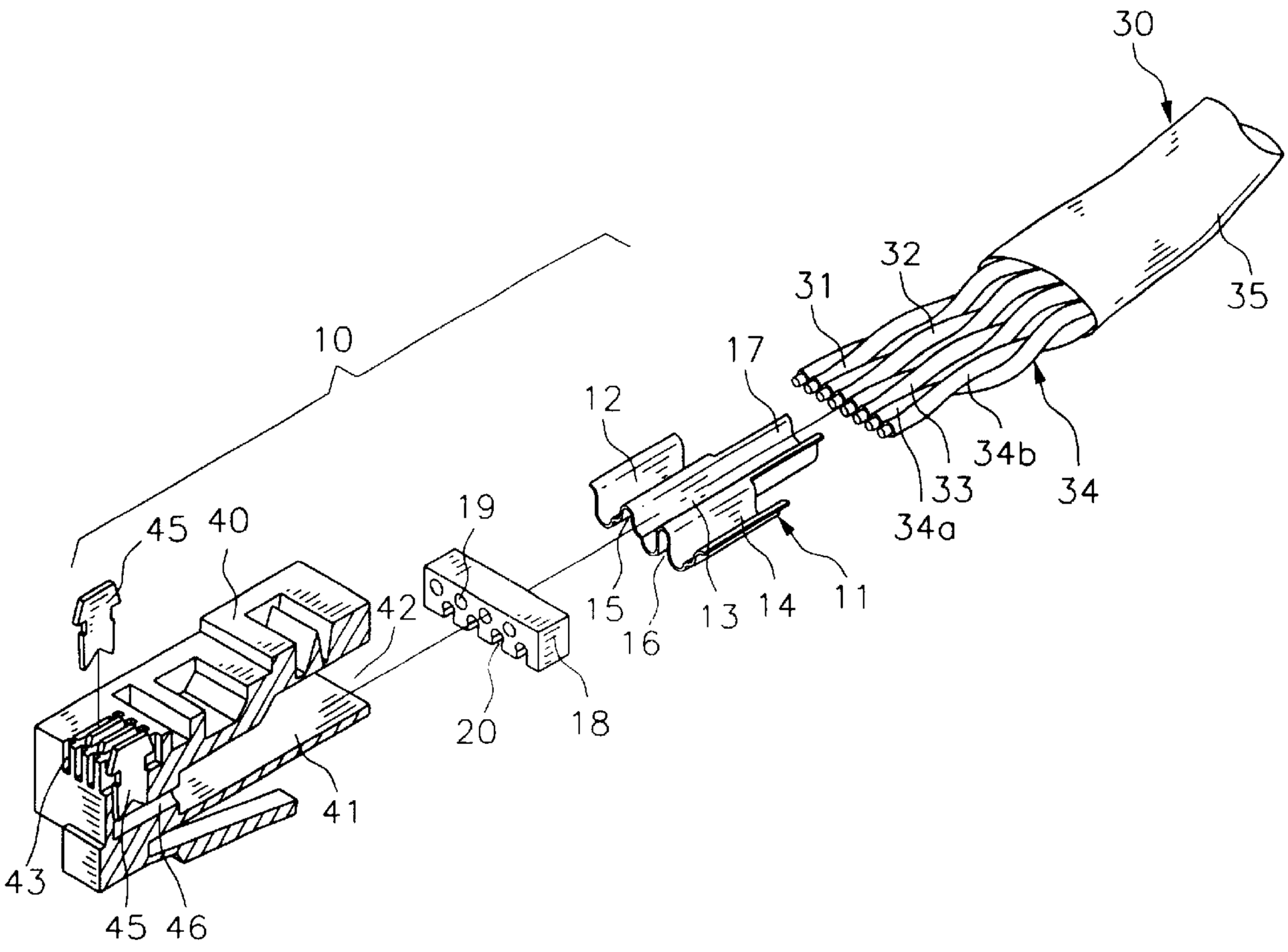
(57) **ABSTRACT**

A network data transmission cable connector is constructed to include a connector plug, a plastic conductor holder block and a metal shield respectively mounted in the connector plug and adapted to guide the electrically insulated conductors of the twisted pairs of a cable into contact with respective metal terminals in the connector plug, the metal shield having a corrugated configuration adapted to separate the twisted pairs of the cable, for enabling the first, second and third twisted pairs of the cable to be separately supported above the metal shield and the two electrically insulated conductors of the fourth twisted pair of the cable to be separately supported below the metal shield.

3 Claims, 5 Drawing Sheets



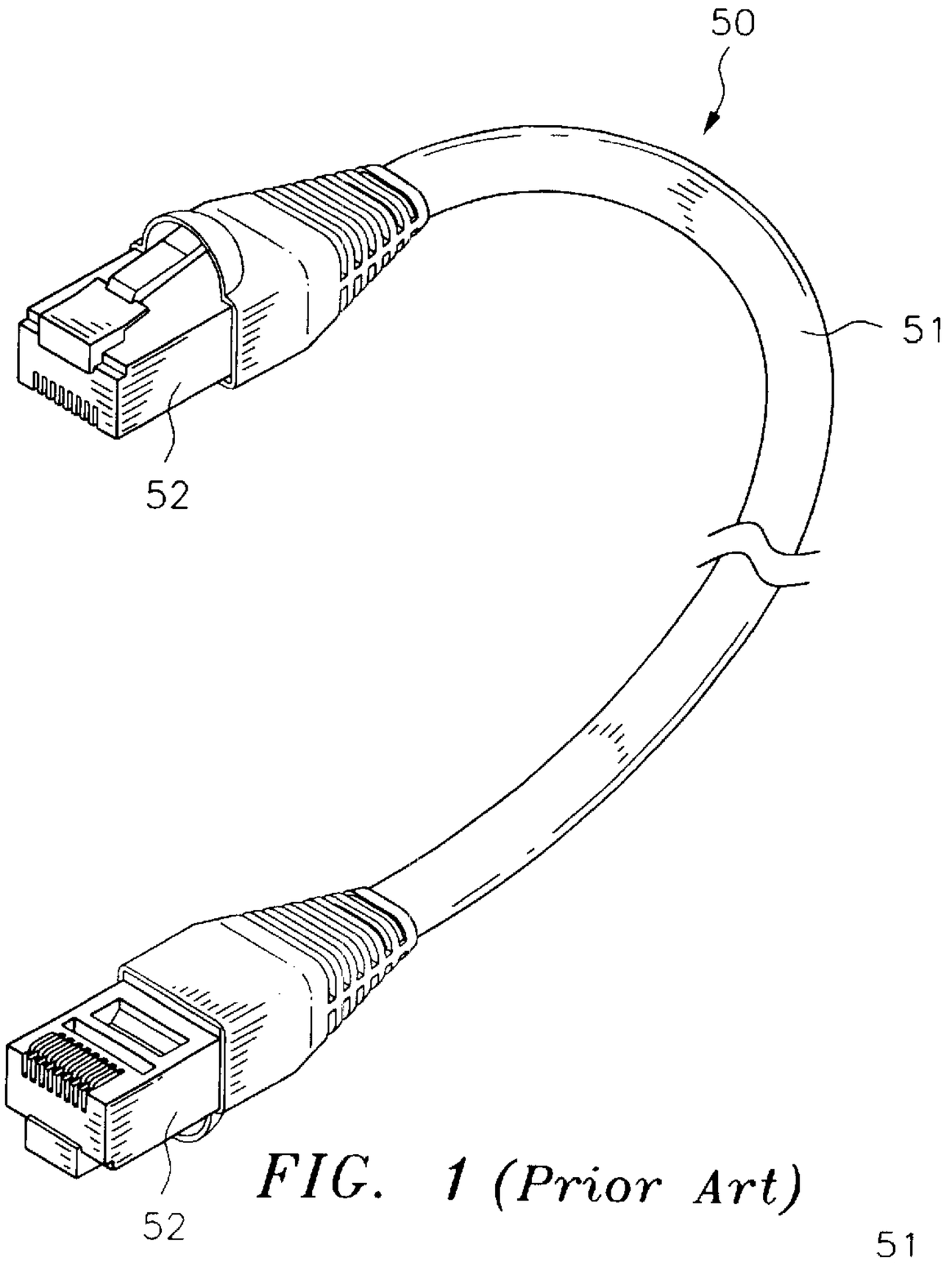


FIG. 1 (Prior Art)

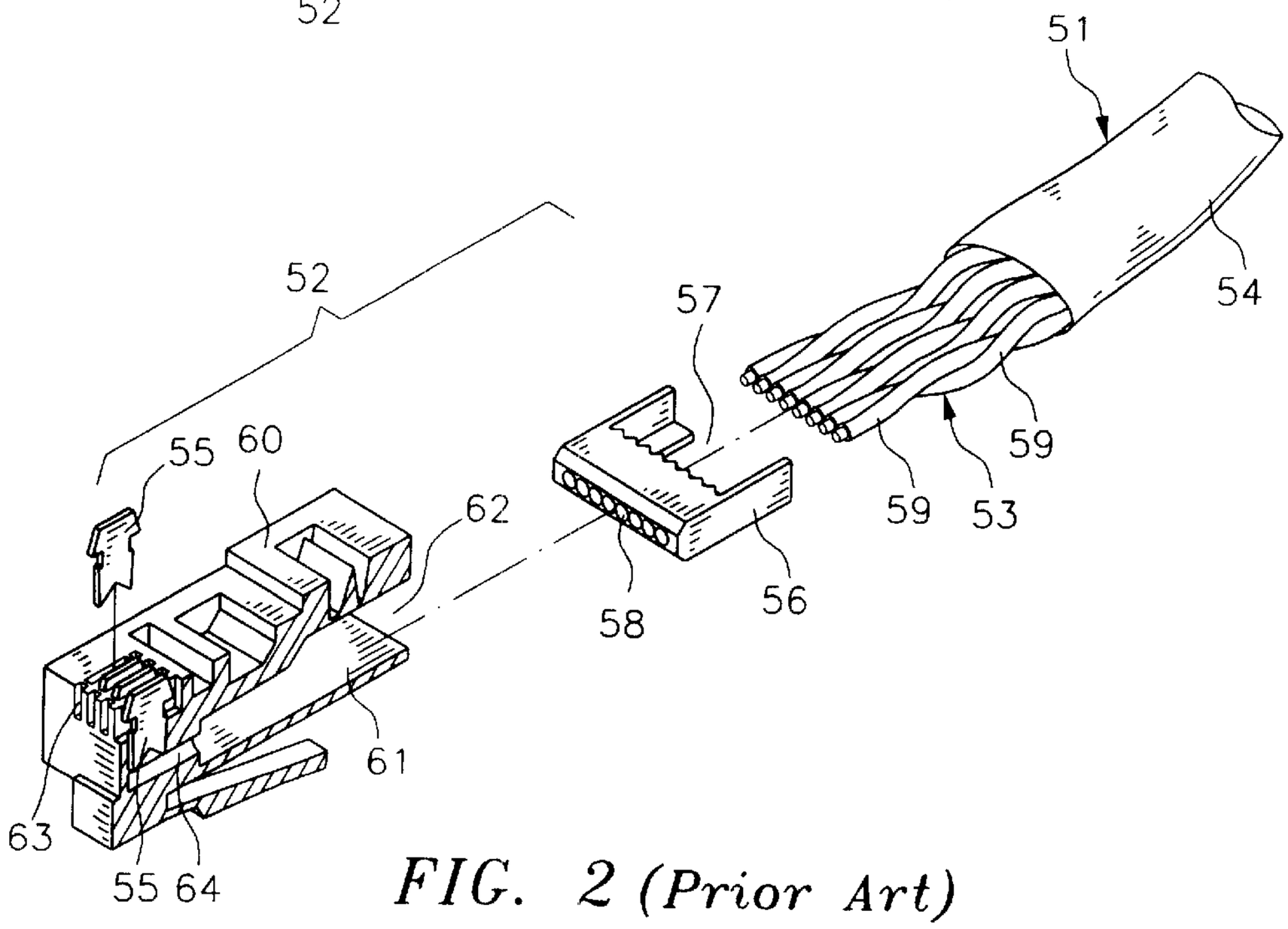


FIG. 2 (Prior Art)

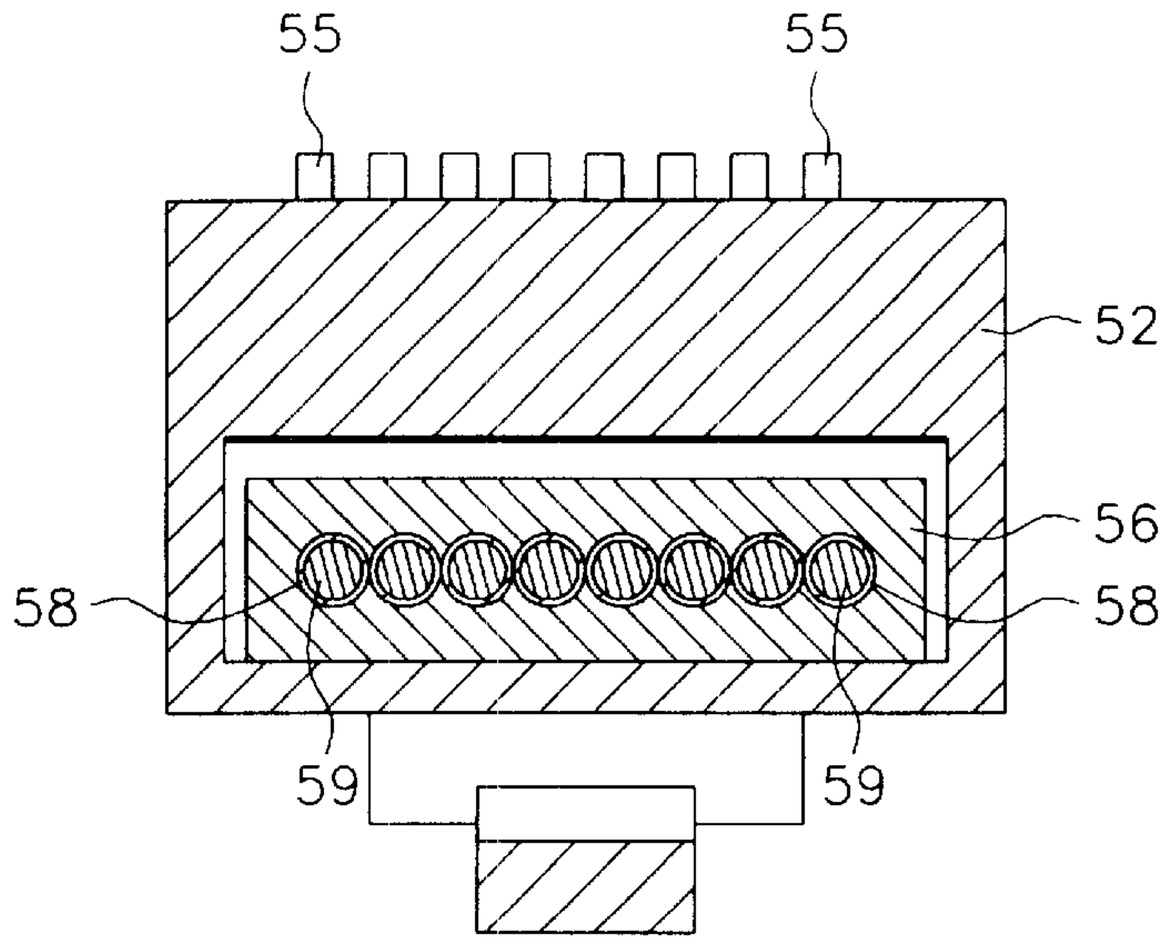


FIG. 3 (Prior Art)

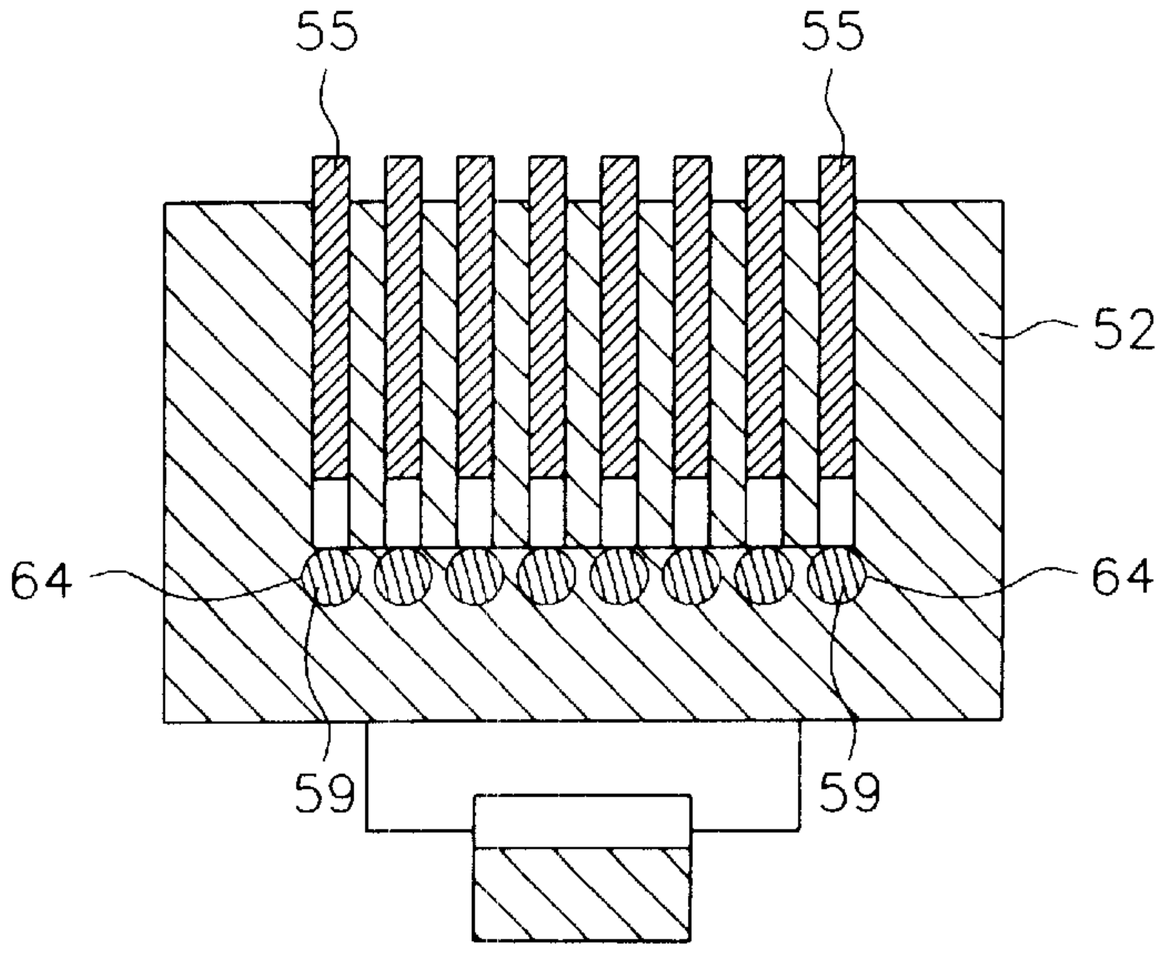
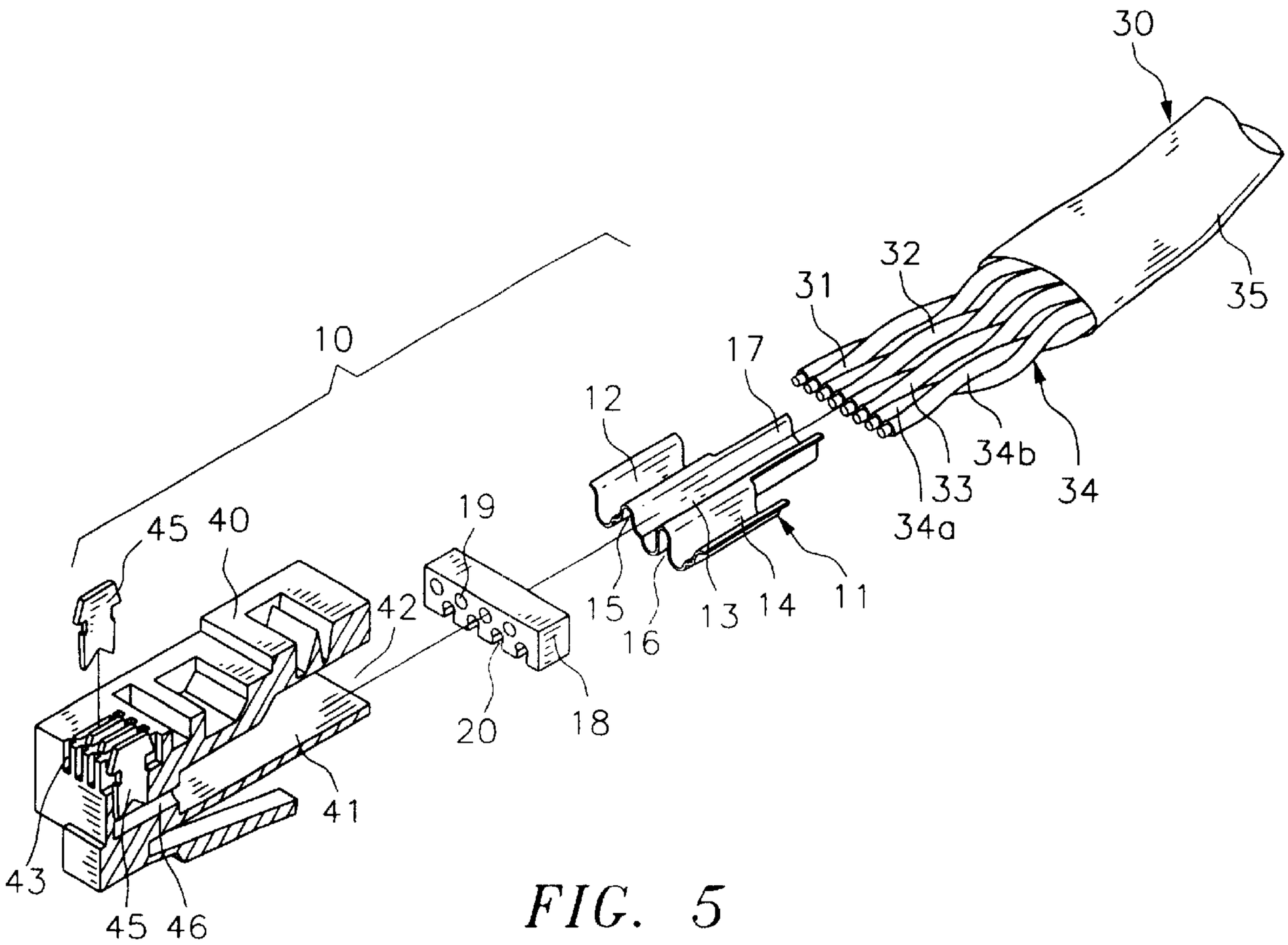


FIG. 4 (Prior Art)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34b
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34a
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FIG. 5

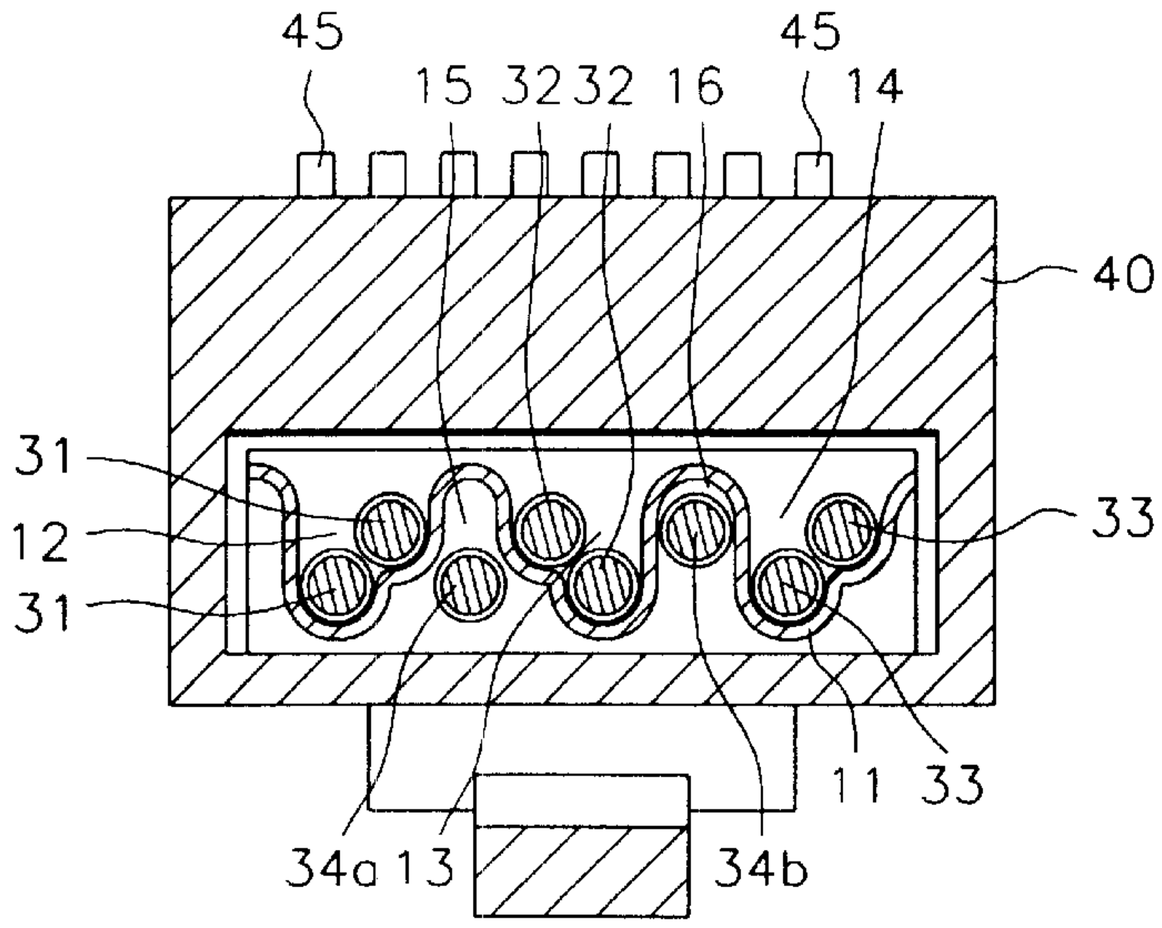
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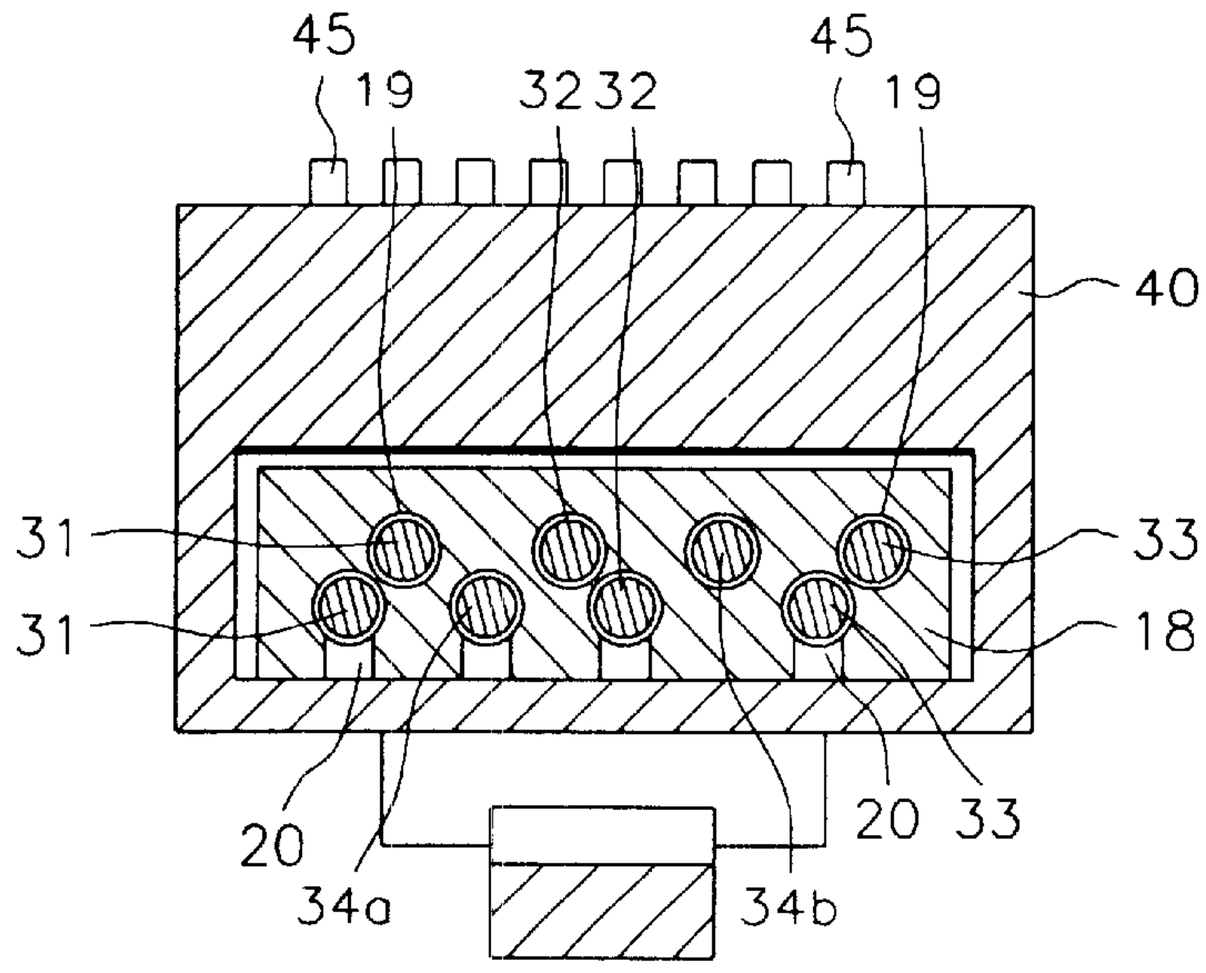
FIG. 6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19
32 32
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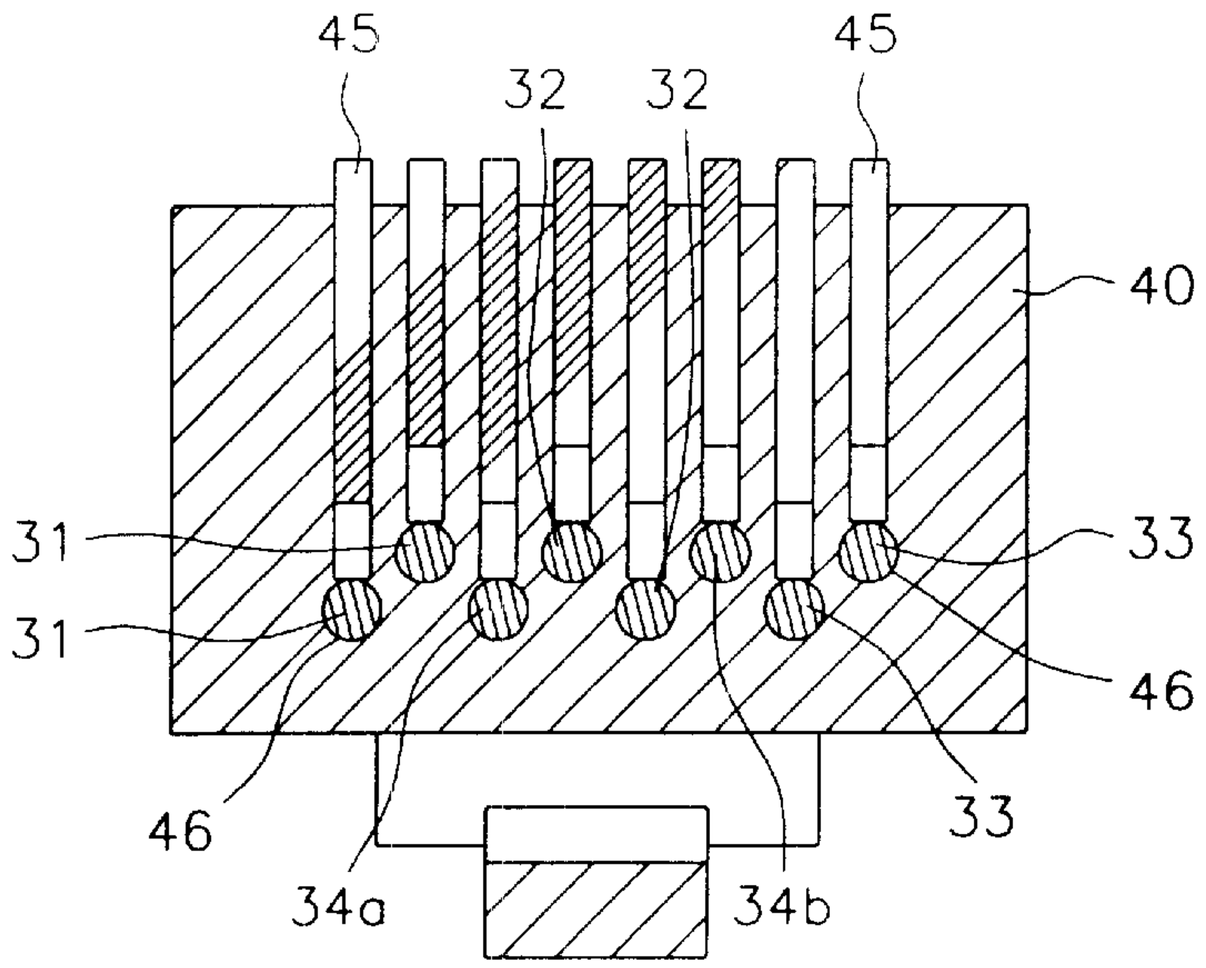
34a
34b

FIG. 7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34a
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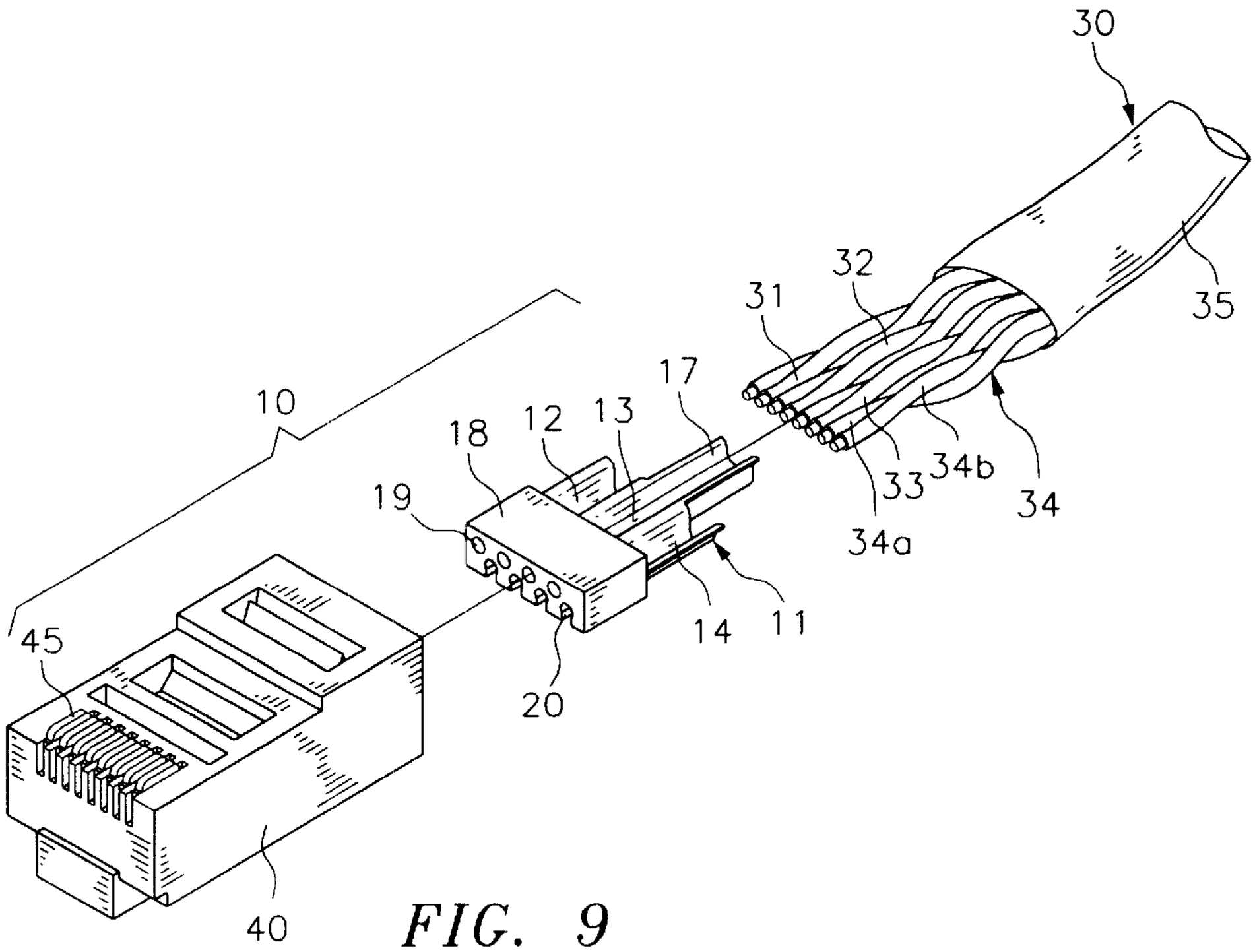
FIG. 8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34b
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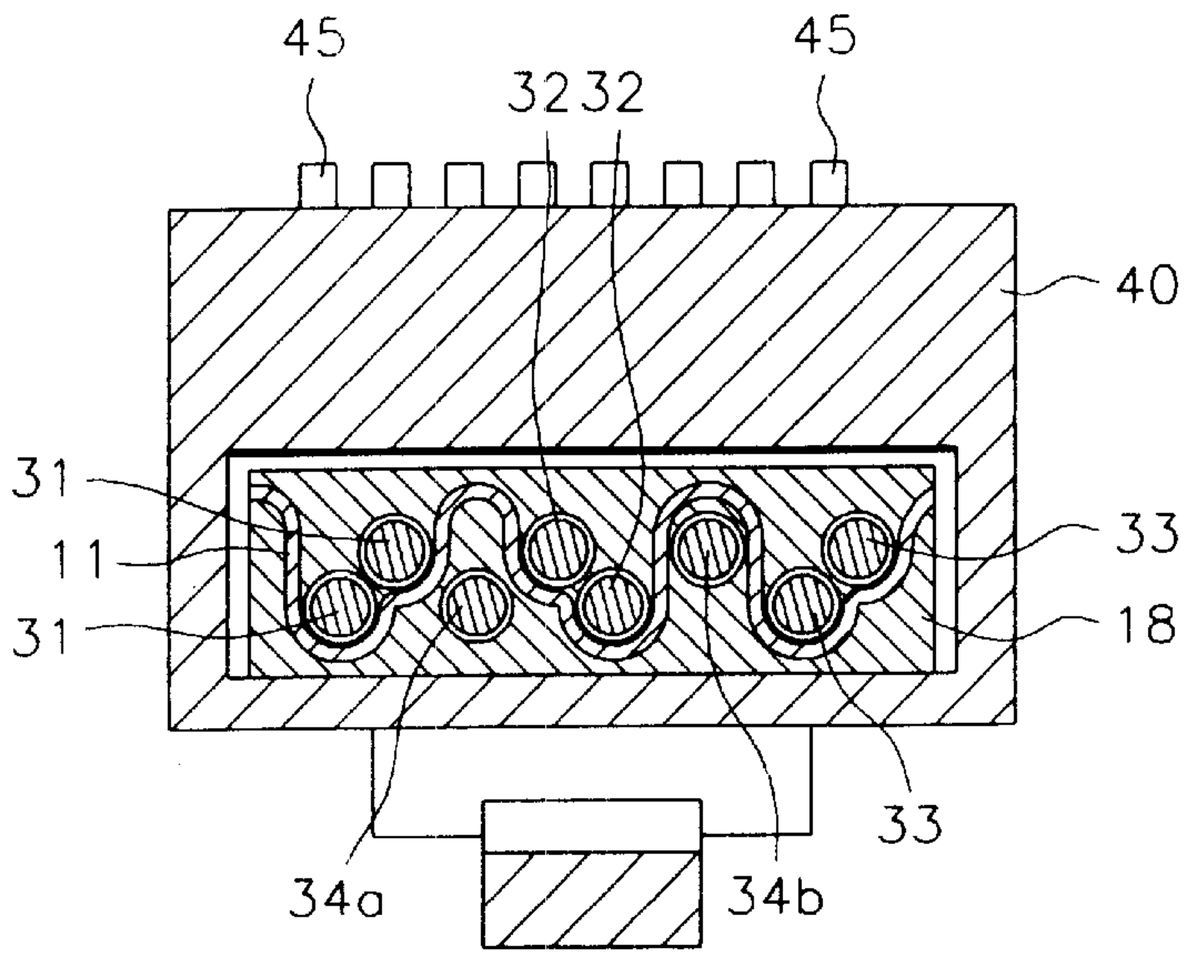
FIG. 9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32 32
40
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33
18
34a
34b
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FIG. 10

NETWORK DATA TRANSMISSION CABLE CONNECTOR

BACKGROUND OF THE INVENTION

The present invention relates to electric connectors and, more specifically, to a network data transmission cable connector for connection between a cable and a modem.

Twisted pairs, coaxial cables, and fiber optical cables are commonly used as data transmission media for data transmission between transmitter means and receiver means.

A twisted pair includes two electrically insulated conductors arranged together in a spiral form. It can be used as a communication chain. As illustrated in FIG. **1**, a network transmission cable **50** is comprised of a cable **51**, and two connectors **52**. The cable **51** is comprised of multiple twisted pairs **53** (for example, four twisted pairs as shown in FIG. **2**) arranged in parallel, and a protective sleeve **54** covering the twisted pairs **53**. The connectors **52** are respectively connected to the two ends of cable **51** for enabling the cable **51** to be connected between two communication apparatus. It is well known that arranging electrically insulated conductors **59** in twisted pairs **53** greatly reduces electromagnetic interference between the electrically insulated conductors **59**. However, the lead ends and tail ends of the electrically insulated conductors **59** of the twisted pairs **53** must be maintained straight, so that the electrically insulated conductors **59** can be respectively inserted into the respective connectors **52**, and the respective terminals **55** of the connectors **52** can pierce through the insulator of the respective electrically insulated conductors **59** to make a respective electric contact (see FIG. **4**). Because the lead ends and tail ends of the electrically insulated conductors **59** of the twisted pairs **53** are maintained straight in the connectors **52**, electromagnetic interference exists in the connectors **52**.

In order to eliminate the aforesaid electromagnetic interference problem, an improved structure of connector **52** is developed. This improved structure of connector **52**, as shown in FIG. **2**, comprises a connector plug **60**, and a plastic conductor holder **56**. The connector plug **60** comprises a backwardly extended mounting chamber **61**, a back opening **62** on the back side thereof through which the plastic conductor holder **56** is inserted into the mounting chamber **61**, a plurality of horizontal conductor slots **64** respectively forwardly extended from the mounting chamber **61** and adapted to receive the electrically insulated conductors **59** of the twisted pairs **53** of the cable **51**, a plurality of vertical terminal slots **63** respectively disposed at the front side thereof in communication with the conductor slots **64**, and a plurality of metal terminals **55** respectively mounted in the vertical terminal slots **63**. The plastic conductor holder **56** holds the electrically insulated conductors **59** of the twisted pairs **53** of the cable **51** in the mounting chamber **61** of the connector plug **60**, comprising a back opening **57**, which receive the twisted pairs **53** of the cable **51**, and parallel conductor slots **58**, which receive the electrically insulated conductors **59** of the twisted pairs **53** of the cable **51** respectively, for enabling the electrically insulated conductors **59** of the twisted pairs **53** of the cable **51** to be respectively inserted into the conductor slots **64** of the connector plug **60** upon insertion of the plastic conductor holder **56** with the twisted pairs **53** of the cable **51** into the mounting chamber **61** of the connector plug **60**, so that the metal terminals **55** can pierce through the insulator of each electrically insulated conductor **59** of the twisted pairs **53** of the cable **51** to make a respective electric contact (see FIG. **3**). Because the lead (or tail) ends of the electrically insulated conductors **59** of the twisted pairs **53** of the cable **51** are kept straight for contact with the metal terminals **55** respectively, electromagnetic interference exists in the straight lead (or tail) ends of the electrically insulated conductors **59** of the twisted pairs **53** of the cable **51**. Furthermore, because the conductor holder **56** is molded from plastics, it cannot protect the electrically insulated conductors **59** of the twisted pairs **53** of the cable **51** against electromagnetic interference.

SUMMARY OF THE INVENTION

The present invention has been accomplished under the circumstances in view. It is the main object of the present invention to provide a network data transmission cable connector, which minimizes electromagnetic interference between the conductors of the twisted pairs of the cable.

According to one aspect of the present invention, the network data transmission cable connector is adapted to receive the electrically insulated conductors of the twisted pairs of a cable having a protective outer sleeve and 4 twisted pairs in the protective outer sleeve. The network data transmission cable connector comprises a connector plug, a plastic conductor holder block and a metal shield respectively mounted in the connector plug and adapted to guide the electrically insulated conductors of the twisted pairs of a cable into contact with respective metal terminals in the connector plug, the metal shield having a corrugated configuration adapted to separate the twisted pairs of the cable, for enabling the first, second and third twisted pairs of the cable to be separately supported above the metal shield and the two electrically insulated conductors of the fourth twisted pair of the cable to be separately supported below the metal shield.

According to another aspect of the present invention, the conductor holder block comprises eight conductor holes alternatively arranged into two horizontal rows at different elevations for guiding the electrically insulated conductors of the twisted pairs of the cable separately into contact with the respective metal terminals of the connector plug.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a network data transmission cable according to the prior art.

FIG. **2** is an exploded view of the network data transmission cable according to the prior art.

FIG. **3** is a sectional view in an enlarged scale of the connector shown in FIG. **2**.

FIG. **4** is another sectional view in an enlarged scale of the connector shown in FIG. **2**.

FIG. **5** is an exploded view, partially cutaway of the present invention.

FIG. **6** is a sectional view in an enlarged scale of the present invention.

FIG. **7** is another sectional view in an enlarged scale of the present invention.

FIG. **8** is still another sectional view in an enlarged scale of the present invention.

FIG. **9** is an exploded view of an alternate form of the present invention.

FIG. **10** is a sectional view in an enlarged scale of the embodiment shown in FIG. **9**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. **5** and **6**, a network data transmission cable connector **10** is shown comprised of a connector plug

40, a conductor holder block **18**, and a metal shield **11**. The connector plug **40** comprises a backwardly extended mounting chamber **41**, a back opening **42** on the back side thereof through which the metal shield **11** and the conductor holder block **18** are inserted into the mounting chamber **41**, a plurality of horizontal conductor slots **46** respectively forwardly extended from the mounting chamber **41** and adapted to receive the electrically insulated conductors **34***a*;**34***b* of the twisted pairs **31~34** of the cable **30**, a plurality of vertical terminal slots **43** respectively disposed at the front side thereof in communication with the conductor slots **46**, and a plurality of metal terminals **45** respectively mounted in the vertical terminal slots **43**. The horizontal conductor slots **46** are alternatively arranged into two horizontal rows at different elevations (see FIG. **6**). After connection of the network data transmission cable connector **10** to the cable **30**, the metal terminals **45** respectively pierce the insulator of each of the electrically insulated conductors **34***a*;**34***b* of the twisted pairs **31~34** of the cable **30** to make a respective electric contact (see FIG. **8**). The metal shield **11** is a thin sheet of metal mounted in the mounting chamber **41** of the connector plug **40** to separate the twisted pairs **31~34** of the cable **30**, i.e., to let a part of the twisted pairs **31~34** of the cable **30** be supported on the top side of the metal shield **11** and the other part of twisted pairs **31~34** of the cable **30** be arranged at the bottom side of the metal shield **11**. According to the present preferred embodiment, the metal shield **11** is a thin sheet of metal stamped into a corrugated configuration defining three parallel grooves, namely, the first longitudinal groove **12**, the second longitudinal groove **13** and the third longitudinal groove **14** on the top side thereof adapted to receive the first twisted pair **31**, second twisted pair **32** and third twisted pair **33** of the cable **30** respectively, and two parallel grooves, namely, the fourth longitudinal groove **15** and the fifth longitudinal groove **16** on the bottom side thereof adapted to receive the two electrically insulated conductors **34***a*;**34***b* of the fourth twisted pair **34** of the cable **30**. Because the first twisted pair **31**, second twisted pair **32** and third twisted pair **33** of the cable **30** are respectively separated from one another by the first longitudinal groove **12**, second longitudinal groove **13** and third longitudinal groove **14** of the metal shield **11** and the two electrically insulated conductors **34***a*;**34***b* of the fourth twisted pair **34** are separated from each other by the fourth longitudinal groove **15** and fifth longitudinal groove **16** of the metal shield **11**, electromagnetic interference in the network data transmission cable connector **10** is minimized. The metal shield **11** further comprises rear extension **17** backwardly extended from the middle part thereof (the rear end of the second longitudinal groove **13**) for insertion into the protective sleeve **35** of the cable **30** to secure the metal shield **11** positively to the cable **30**.

Referring to FIGS. **5** and **7**, the conductor holder block **18** is a rectangular block molded from plastics, comprising eight conductor holes **19**;**20** alternatively arranged into two horizontal rows at different elevations and adapted to receive the electrically insulated conductors of the twisted pairs **31~34** of the cable **30**, for enabling the electrically insulated conductors of the twisted pairs **31~34** of the cable **30** to be respectively inserted into the conductor slots **46** of the connector plug **40**. The conductor holes **19**;**20** can be made having any of a variety of forms. For example, the conductor holes **19** at the upper elevation can be open holes horizontally extended through front and back sidewalls of the conductor holder block **18** and vertically extended through the top sidewall of the conductor holder block **18**, and the conductor holes **20** at the lower elevation can be open holes horizontally extended through front and back sidewalls of the conductor holder block **18** and vertically extended through the bottom sidewall of the conductor holder block **18**.

In the embodiment shown in FIG. **5**, the conductor holder block **18** and the metal shield **11** are separately installed in the connector plug **40**. As an alternate form of the present invention, the conductor holder block **18** can be directly molded on the front side of the metal shield **11** (see FIGS. **9** and **10**).

A prototype of network data transmission cable connector has been constructed with the features of FIGS. **5~10**. The network data transmission cable connector functions smoothly to provide all of the features discussed earlier.

Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

What the invention claimed is:

1. A network data transmission cable connector adapted to receive electrically insulated conductors of twisted pairs of a cable having a protective outer sleeve and 4 twisted pairs in the protective outer sleeve, comprising:

a connector plug, said connector plug comprising a backwardly extended mounting chamber adapted to receive the twisted pairs of the cable, a back opening through which the twisted pairs of the cable are inserted into said mounting chamber, a plurality of horizontal conductor slots respectively forwardly extended from said mounting chamber and adapted to receive the electrically insulated conductors of the twisted pairs of the cable respectively, said horizontal conductor slots being alternatively arranged into two horizontal rows at different elevations, and a plurality of vertical terminal slots respectively disposed at a front side thereof in communication with said conductor slots;

a metal shield mounted inside said mounting chamber of said connector plug and separating the twisted pairs of the cable into an upper part supported above said metal shield and a lower part arranged below said metal shield;

a conductor holder block mounted inside said mounting chamber of said conductor plug and disposed in front of said metal shield and adapted to guide the electrically insulated conductors of the twisted pairs of the cable into the conductor slots of said connector plug, said conductor holder block comprising an upper horizontal row of conductor holes and a lower horizontal row of conductor holes alternatively arranged at different elevations for the passing of the electrically insulated conductors of the twisted pairs of the cable; and

a plurality of metal terminals respectively mounted in said vertical terminal slots and adapted to pierce the insulation of each of the electrically insulated conductors of the twisted pairs of the cable to make a respective electric contact, wherein said metal shield comprises a first longitudinal groove, a second longitudinal groove, and a third longitudinal groove respectively disposed on a top sidewall thereof and adapted to receive the first, second and third twisted pairs of the cable respectively, a fourth longitudinal groove and a fifth longitudinal groove respectively disposed on a bottom sidewall thereof and receiving the two electrically insulated conductors of a fourth twisted pair of the cable.

2. The network data transmission cable connector of claim **1** wherein said metal shield further comprises a rear extension backwardly extended from a middle part thereof for insertion into the outer protective sleeve of the cable to secure said metal shield to the cable.

3. The network data transmission cable connector of claim **1** wherein said metal shield further comprises a rear extension backwardly extended from said second longitudinal groove for insertion into the outer protective sleeve of the cable to secure said shield to the cable.

* * * * *